

REMARKS

The application has been amended to place the application in condition for allowance at the time of the next Official Action.

Claims 1-12 are pending in the application.

Applicant notes with appreciation the indication that claim 5 is allowed.

Claim 10 is amended to depend from claim 9 to address the claim objection noted in the Official Action.

Claims 1-3 and 8 were rejected as unpatentable over applicant's disclosed prior art Figure 5 in view of CHANG et al 6,403,389. That rejection is respectfully traversed.

The Official Action recognizes that Applicant's disclosed prior art Figure 5 does not disclose: 1) two probes arranged at a spacing determined by a distance between exposed portions of a pattern; 2) a bias voltage meter for supplying bias voltage between both ends of the pattern and 3) a detector for detecting a potential difference between the two probes.

CHANG is offered for these features with the Official Action concluding that it would have been obvious to incorporate the teachings of CHANG into Applicant's disclosed prior art probe apparatus to ensure manufacturability and performance of integrated circuits.

However, this conclusion is untenable for at least the following reasons.

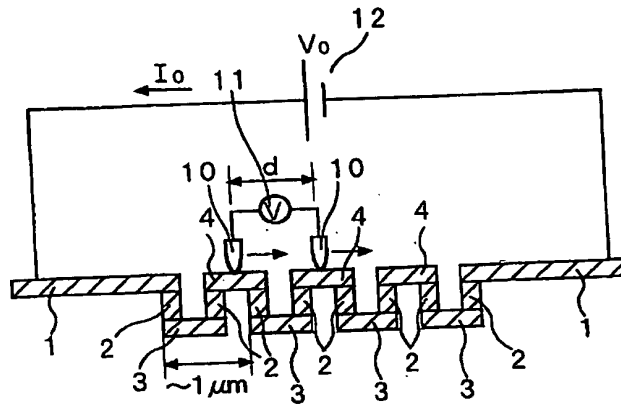
First, the proposed combination of references disregards the claimed invention as a whole.

The Federal Circuit has held that in determining the differences between the prior art and the claims, the question under 35 USC 103 is not whether the differences themselves would have been obvious, but whether the claimed invention as a whole would have been obvious. *Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 218 USPQ 871 (Fed. Cir. 1983).

Claim 1 is directed to a scanning apparatus for detecting anomalies in a passive element out of a plurality of passive elements that are connected together to form a chain pattern. A scan section moves two probes over the surface of a wafer so that each passive element can be inspected in turn.

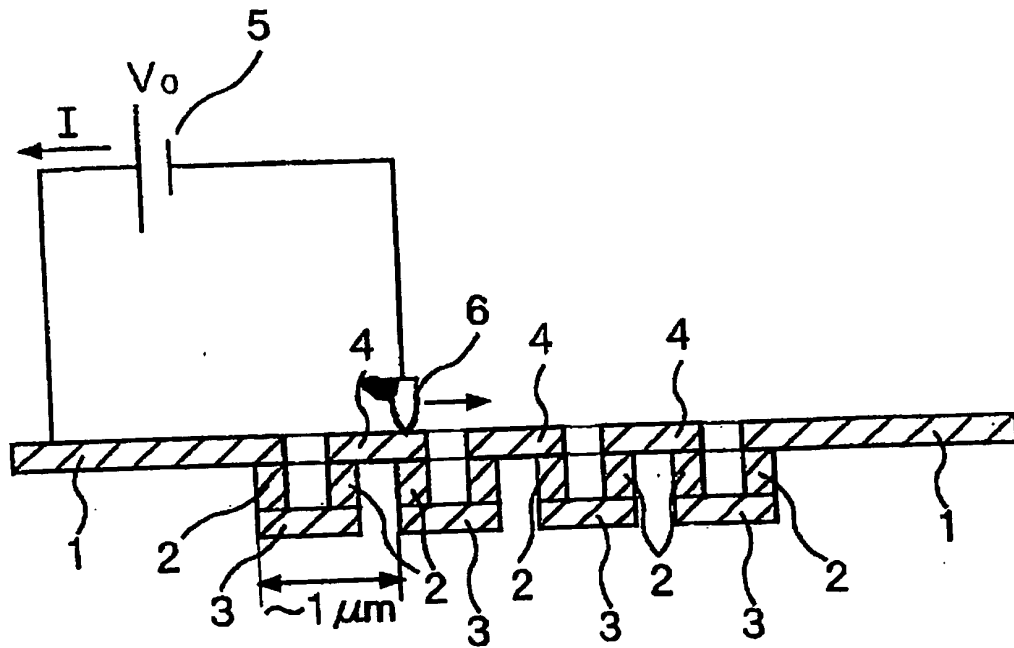
Figure 1, reproduced below shows a plurality of connected passive elements each having an upper interconnect 4, a pair of through holes 2 and a lower interconnect 3. In the embodiment of Figure 1, the probes 10 are moved in the direction indicated while keeping a constant spacing between the probes.

FIG. 1



In the prior art, as seen in Figure 5, reproduced below, a single probe 6 was used that formed a circuit with pad 1.

FIG.5



In CHANG, a test structure is used to measure resistance. However, the resistance is based on an entire interconnect layer, not one portion of an interconnect layer.

Moreover, CHANG is silent as to the use of probes. Although probes may be used to measure the resistance in CHANG, nevertheless, there is no disclosure in CHANG that the probes are spaced at a predetermined distance and that the distance is maintained as the probes are move over the surface of the wafer.

Rather, as seen in Figure 10 of CHANG, noted in the Official Action and reproduced below, CHANG performs a single measurement across an entire layer based on a voltage applied to pads 11202, 11203.

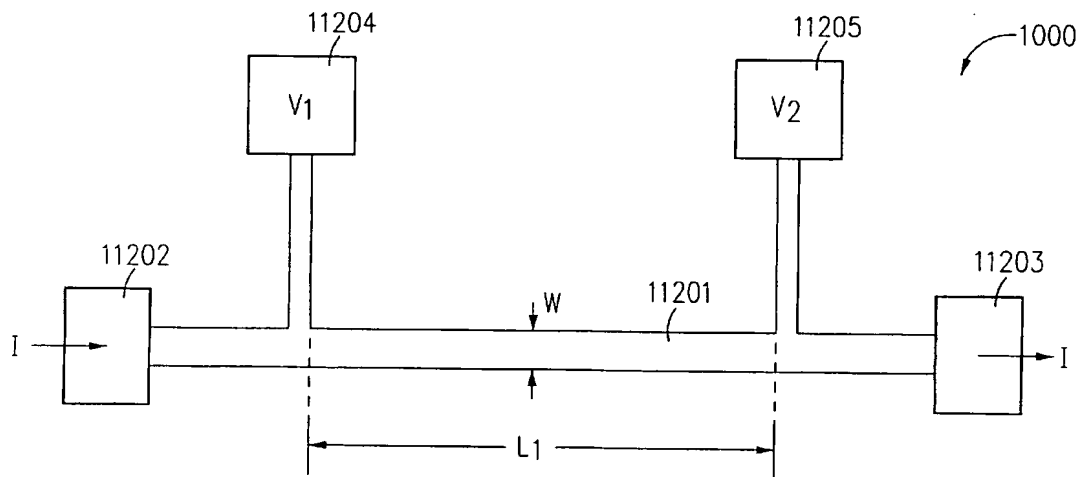


FIG. 10

In view of the above, it is apparent that the prior art perceived a need to use a single probe to test a plurality of elements or use two probes to test an entire layer. Moreover,

when the two probes were used there is no disclosure of keeping the probes at a constant spacing.

In contrast, the present inventors found that by keeping a constant spacing, the potential difference between those points on the pattern which the probes contact can be measured without influencing the contact resistance between the probes and the pattern. In this way, abnormalities in the pattern can be found even for a resistance value of about 10 ohms.

As the insight needed to test each individual element using two constantly spaced probes is not suggested by the references, the structure effectuating it would not have been obvious to one of ordinary skill in the art.

Second, the motivation offered in the Official Action does not suggest the desirability of the combination.

The Federal Circuit has held that the mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990).

CHANG is directed to testing test structures so that a specific length-to-width ratio can be used to obtain a desired sheet resistance. The values obtained are then used in an interconnect layer process. These values are used to ensure manufacturability and performance.

In contrast, the disclosed prior art discloses an apparatus for detecting defects during process steps of a manufacturing process.

CHANG does not provide any disclosure on how to improve upon defects that occur during the manufacturing process and instead is based on optimizing sheet resistance by using a test structure prior to manufacturing. One of ordinary skill looking to analyze defects that occur during a manufacturing process would not have been motivated to look to the disclosure of a pre-process apparatus as disclosed by CHANG. Thus, CHANG could not suggest the desirability of such a combination. Accordingly, it would not have been obvious to make such a combination or modification.

Independent claim 2 includes the limitations of claim 1 and the analysis above regarding claim 1 is equally applicable to claim 2.

Claims 3 and 8 depend from claims 1 and 2 respectfully and further define the invention and are believed patentable at least for depending from an allowable independent claim.

Claims 4, 6, 7 and 9-12 were rejected as unpatentable over applicant's disclosed prior art Figure 5 in view of CHANG and further in view of ARNOLD et al. US Publication No. 2003/0062915. That rejection is respectfully traversed.

ARNOLD is only cited for the disclosure of features related to the shape of the probe. ARNOLD does not disclose what

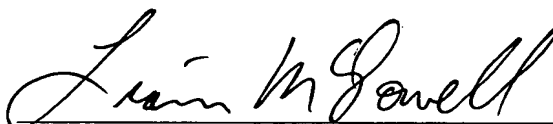
is recited in claims 1 and 2. As set forth above, applicant's disclosed prior art in view of CHANG does not disclose that which is recited in claims 1 and 2. Since claims 4, 6 and 7 depend from claim 1 and claims 9-12 depend from claim 2, and further define the invention, claims 4, 6, 7 and 9-12 are believed patentable at least for depending from an allowable independent claim.

In view of the present amendment and foregoing remarks, it is believed that the present application has been placed in condition for allowance. Reconsideration and allowance are respectfully requested.

The Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 25-0120 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17.

Respectfully submitted,

YOUNG & THOMPSON



Liam McDowell, Reg. No. 44,231
745 South 23rd Street
Arlington, VA 22202
Telephone (703) 521-2297
Telefax (703) 685-0573
(703) 979-4709

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